Concept Attainment Introduction Vignette

Adapted from Eggen P. D., & Kauchak D. P. (2001)

The Concept Attainment Model is a lesson style that students are probably not familiar with. This being the case it is wise to introduce the model using a simple (possibly non-content example). The following vignette will serve as an example as to how the introduction might unfold.

Mrs. Maggio begins her science class by telling students that today they will be doing a different kind of lesson. She states, "Today's lesson is called a concept attainment lesson. The way it works is that I have an idea in my head that you are all going to try and figure out. The object of the lesson is for you to define the concept or idea that I have, and to practice your scientific reasoning skills." Mrs. Maggio has prepared the following list of data (positive and negative examples of her concept) for the lesson. She will only show the class two items at a time.

Apple	Y
Rock	N
Tomato	Y
Carrot	N
Avocado	Y
Celery	N
Peach	Y
Squash	Y
Orange	Y
Lettuce	N
Artichoke	N
Potato	N

Mrs. Maggio turns on the overhead projector and shows the students the first two items on her data list, Apple Y and Rock N. She explains, "Notice on the overhead that apple has a Y next to it and rock has an N next to it. That means that apple is a positive example of my idea and rock is a negative example of my idea. What do think the idea might be. . . ?"

"We eat apples," Jenny volunteers.

"Good," Mrs. Maggio smiles, "so the idea might be. . . ?"

Jenny does not respond.

". . .Things. . . we. . .?" Mrs. Maggio prompts.

"Eat?" Jenny continues hesitantly.

With that, Mrs. Maggio writes the word Hypotheses on the board, underlines it, and asks, "What do we mean by the term hyptheses? . . . Anyone?"

". . . It's, like . . . kind of a guess," Fina volunteers after a few seconds.

"Excellent," Mrs. Maggio nods to Fina. "Instead of calling it a guess or an educated guess," she continues, "lets refer to hypothesis as a prediction based upon evidence or data. In this lesson our data will be the examples and non-examples shown on the overhead and you as a class will analyze this data and generate hypotheses predicting what my idea is." Mrs. Maggio then writes, *things we eat* under the word *Hypotheses*.

"What else might be a possibility?" Mrs. Maggio goes on. . . . "James?"

"It could also be things that are alive, or . . . were."

"Fine," Mrs. Maggio replies, writing the words *living things* on the board under the list of hypotheses. "Any others? . . . Blake?"

"Well, this is . . . sort of like James's . . . but it's a little different. How . . . about 'things that grow on plants'"?

"Okay . . . . Does everyone see how living things and things that grow on plants are different? . . . No? Karen, can you explain that to the class?"

". . . Like . . . well, there are some living things that don't grow on plants . . . . Like animals."

"Excellent thinking, Karen. Do we have any other ideas?"

After pausing for a few seconds, Mrs. Maggio continues, "Well then, let's look a couple more pieces of data." She shows tomato as an example and carrot as a non-example.

Mrs. Maggio continues, "What does this new information tell us? Let's first look at the hypotheses we have. Are they still acceptable? . . . Serena?"

". . . *It can't be things to eat*," Serena responded.

"Explain why, Serena," Mrs. Maggio encourages.

". . . Well . . . we eat carrots . . . and carrot is not an example."

"Good, Serena," Mrs. Maggio smiled. "Very good, clear explanation. The added information we have requires that we eliminate that hypothesis."

"Now, lets look at the rest of the hypotheses . . . . How about *things that grow on plants*? . . . Sherry?"

". . . Things that grow on plants is out."

"Why? . . . Explain," Mrs. Maggio smiles.

". . . A carrot grows from a plant."

"And?" Mrs. Maggio probes.

"And . . . it's not an example," Sherry adds quickly after Mrs. Maggio's prompt.

"Excellent, Sherry. Good thinking and good explanation."

She turns to the class. "Now, how about *living things*?"

"Also out," Jamie volunteered.

"Go on."

". . . Carrot is living and it's not an example," Jaime explains, beginning to see how the process is intended to work.

"Yes! That's it," Mrs. Maggio waves enthusiastically. "You are really catching on to

this."

"How about things we eat that grow above the ground?" Renita offered.

"Are you suggesting another hypothesis?" Mrs. Maggio asked.

". . . I . . . think so."

"Very good. Perhaps I should have pointed that out in the beginning. We can always add hypotheses as long as the data support them. . . . Now how will we know if the data do indeed support them? . . . Anyone?"

No one responds.

"This is a little tough to describe, so I'll try to help you. A hypothesis is supported if *all* the examples fit the hypothesis, and if none of the non-examples fit the hypothesis."

"For example," she goes on, "do both an apple and a tomato grow above the ground?"

"Yes," the class says in unison.

"Do either a rock or a carrot grow above the ground?"

"Part of the carrot does," Phil notes.

"Good thinking," Mrs. Maggio nods. "What is your reaction to Phil's point, Renita?"

"I meant the part we eat."

"Okay, is that all right with you, Phil?"

Phil shakes his head. ". . . I think we should say, 'plant parts we eat that are above ground.'"

"Excellent. Phil. We can also modify hypotheses so that they better fit our data. This is the kind of thinking that we're after. Very well done!"

"Now . . . is the hypothesis, *plant parts we eat that are above ground*, acceptable? . . . Remember, *all* the examples must fit the hypothesis, and *none* of the non-examples can fit the hypothesis."

Among a chorus of nods, "Yeses," and "Okays," Mrs. Maggio continues with the process. Shawn offers the hypothesis *things we eat with seeds in them*, and Marsha offers *red foods*, to the giggles of the class.

Mrs. Maggio then asks in the form of admonishment, "Are apples and tomatoes both red, and are either the rock or the carrot red?"

"No," the students respond.

"Good. . . . Now, I want us to have fun with this, of course, but remember that the only thing that determines whether or not a hypothesis is acceptable is whether or not the data support it. . . . And do the data support *red foods*?"

The class nods, a bit sheepishly.

"Good. . . . Now, I know you didn't mean any harm, but keep that in mind."

Mrs. Maggio then adds an avocado to the Examples list, a piece of celery to the Non-examples list, and again they analyze the hypotheses as they did before.

Mrs. Maggio continues by adding and analyzing hypotheses with a peach, a squash, and an orange as positive examples and a head of lettuce, artichoke, and a potato as negative examples.

The students continue the process with Mrs. Maggio's guidance, narrowing their hypotheses to *things with seeds in them* and finally modifying the hypothesis to *seeds in the edible part of the plant*.

Now Mrs. Maggio asks, "Does anyone know what we call foods that have seeds in the edible part of the plant, like the examples we have here?"

After hesitating a few seconds and hearing no response, she says, “We call these foods *fruits*.” And she writes the word *fruit* on the board.

Mrs. Maggio continues, “Excellent, everyone. Now, we need a good clear definition of fruit. Someone give it a try. . . . Go ahead, Goeff.”

“Okay, . . . Fruits are . . . things we eat . . . that have seeds in them.”

“Seeds in what part?”

“. . . In the part we eat.”

“Very good, Goeff. I’ll revise this a tiny bit to smooth it out a little, but we essentially have it.”

Mrs. Maggio writes on the board, “Fruits are foods we eat with seeds in the edible part.”

Now Mrs. Maggio has the class take out a piece of paper and categorize additional examples as either positive or negative examples of the concept *fruit*.

Eggen P. D., & Kauchak D. P. (2001) The Concept-Attainment Model (Ch. 5, PP.147-168). In *Strategies for teachers: Teaching content and thinking skills.* Needham Heights, MA: Allyn and Bacon.